

NATURAL RESOURCES CONSERVATION SERVICE
CONSERVATION PRACTICE STANDARD

RIPARIAN FOREST BUFFER

(Acre)

CODE 391

DEFINITION

An area predominated by trees and/or shrubs located adjacent to and usually up-gradient from watercourses or water bodies.

PURPOSES

- Create shade to moderate water temperatures to improve habitat for aquatic organisms.
- Provide a source of detritus and large woody debris for aquatic and terrestrial organisms.
- Create wildlife habitat and establish wildlife corridors.
- Reduce excess amounts of sediment, organic material, nutrients and pesticides in surface runoff and reduce excess nutrients and other chemicals in shallow ground water flow.
- Provide a harvestable crop of timber, fiber, forage, fruit, or other crops consistent with other intended purposes.
- Provide protection against scour erosion within the floodplain.
- Restore natural riparian plant communities.

CONDITIONS WHERE PRACTICE APPLIES

On areas adjacent to permanent or intermittent streams, lakes, ponds, wetlands and areas with ground water recharge that are capable of supporting woody vegetation.

There are potentially three management zones that are applied in a riparian buffer depending upon the intended purpose(s) and site conditions. While some water courses have adjacent lands that are not actually higher in elevation than the streambank, this standard uses the term “upgrade” to refer to the land as you move away from the stream, pond, wetland, etc.

Management Zone 1 is the zone immediately adjacent to the water from mean flow level to the top of the bank. Zone 1 contributes most to the instream habitat with large woody debris, detritus and shade. Herbaceous and woody (usually water-loving) plants normally dominate vegetation. Streambank stabilization is of utmost concern in Zone 1 and must be achieved prior to installing a riparian forest buffer. The minimum width for Zone 1 is 15 feet for all purposes.

Management Zone 2 extends upgrade from Zone 1 to the outer edge of the stream ecosystem. Zone 2 contains trees and shrubs where more intensive management is allowed to accomplish an intended objective. Zone 2 (along with Zone 1) intercepts sediment, nutrients, pesticides and other pollutants in surface and subsurface water flows. The minimum width of Zone 2 is 20 feet.

Management Zone 3 is upgrade of management Zone 2 and is generally of herbaceous plants or grass. Zone 3 may or may not be needed in a Riparian Forest Buffer. Zone 3 is established if periodic and excessive water flows, erosion and/or sediment from upslope fields or tracts is anticipated. This zone provides protection against scour erosion within the floodplain, particularly useful in streams of Order 3 or higher.

CRITERIA

General Criteria Applicable to All Purposes.

The location, layout and density of the riparian forest buffer will accomplish the intended purpose and function. Initial investigation must indicate the natural potential or historical extent of the riparian zone. For streams, one or both sides may need treatment. *Width* of a riparian forest buffer will be measured horizontally on a line perpendicular to the shoreline or streambank. Measurement will begin at the normal water line and extend to the outer edge of the riparian-upland ecotone as indicated by yearlong or seasonal soil wetness, geomorphology or floodplain topography. The buffer width will not include the area in the stream or water body itself. *Length* is measured parallel to the shoreline or bank. Consider extending to the full length of the water body, watercourse or ownership or

beyond to connect forest to forest. *Area* (acreage) is a function of the average *length* and *width*.

Widths to use for Riparian Forest Buffers are:

<u>Purpose</u>	<u>MinWidth</u>	<u>MaxWidth</u>
Create shade, lower water temps to improve habitat for aquatic organisms	35 feet	35 feet
Provide source of detritus and woody debris	35 feet	50 feet
Create wildlife habitat and establish travel corridors	35 feet	200 feet
Reduce excess amounts of sediment, organic matter, nutrients, and pesticides in surface runoff and reduce excess nutrients and other chemicals in shallow ground water flow.	35 feet	150 feet
To provide a harvestable crop of timber, fiber, Forage, fruit, or other crops consistent with intended purposes	35 feet	200 feet
To provide protection against scour erosion within the floodplain (Order 3 and greater streams)	100 feet	200 feet
Restore natural riparian communities	35 feet	150 feet

Buffer width = Zone 1 + Zone 2 + Zone 3 (when applicable). Maximum widths can be exceeded only with the written approval of zone specialist with assigned standard responsibility.

Dominant vegetation will consist of existing, naturally regenerated, or planted trees and shrubs suited to the site and the intended purpose. Evidence of past tree growth and

knowledge of similar soils should dictate tree and shrub species selection.

Occasional removal of some tree and shrub products such as high value trees is permitted provided the intended purpose is not compromised by the loss of vegetation or harvesting disturbance.

Necessary site preparation and planting shall be done at a time and manner to insure survival and growth of selected species.

When trees and shrubs must be planted, only viable, high quality and adapted planting stock will be used. Use Tree/Shrub Establishment Standard (612). Pay special attention to site needs of plant species included in plan; i.e. shade tolerance, soil pH and moisture requirements. Adhere to endemic species assemblages as much as possible.

Site preparation shall be sufficient for establishment and growth of selected species and done in a manner that does not compromise the intended purpose.

Livestock shall be controlled or excluded as necessary to achieve and maintain the intended purpose. The amount of herbaceous forage produced in a riparian forest buffer is usually very limited.

Harmful pests present on the site will be controlled or eliminated as necessary to achieve and maintain the intended purpose.

Comply with Texas Forestry Best Management Practices (BMPs) and all other regulations that pertain.

Additional Criteria To Reduce Excess Amounts of Sediment, Organic Material, Nutrients and Pesticides in Surface Runoff and Reduce Excess Nutrients and Other Chemicals in Shallow Ground Water Flow.

An additional strip or area of land, Zone 2, will begin at the edge and up-gradient of Zone 1 and extend a minimum distance of 20 feet, measured horizontally on a line perpendicular to the water body. Criteria for Zone 1 shall apply to Zone 2 except that removal of products such as timber, fiber, nuts, fruit and forbs is permitted and encouraged on a periodic and regular basis provided the intended purpose is not compromised by loss of vegetation or harvesting disturbance.

Zone 2 will be expanded in high nutrient, sediment, and animal waste application areas, where the contributing area is not adequately treated or where an additional level of protection is desired.

A Zone 3 shall be added to the riparian buffer when adjacent to cropland, concentrated animal feeding operations, or other sparsely vegetated or highly erosive areas. Zone 3 will filter sediment, address concentrated flow erosion, and maintain sheet flow. The Filter Strip standard (393) will be used to design Zone 3.

Additional Criteria to Provide Protection Against Scour Erosion Within the Floodplain.

The minimum combined width of Zones 1 and 2 will be 100 feet or 30 percent of the geomorphic flood plain whichever is less, but not less than 35 feet. The geomorphic flood plain is the land adjacent to the baseflow channel that is actively being shaped by the forces of floodwater.

Additional Criteria to Provide Habitat for Aquatic Organisms and Terrestrial Wildlife.

Width of Zone 1 and/or Zone 2 will be expanded to meet the minimum requirements of

the wildlife or aquatic species and associated communities of concern.

Establish plant communities that address the target wildlife needs and existing resources in the watershed.

CONSIDERATIONS

The severity of bank erosion, concentrated flow erosion or mass soil movement and its influence on existing or potential riparian trees and shrubs should be assessed. This is especially important when stream channels are deeply incised where future flood events can drastically widen the streambanks. Watershed-level or contributing area treatment, or bank stability activities may be needed before establishing a riparian forest buffer.

When concentrated flow erosion and sedimentation cannot be controlled vegetatively, consider structural or mechanical treatments.

Favor tree and shrub species that are native, non-invasive, or have multiple values such as those suited for timber, biomass, nuts, fruit, browse, nesting, aesthetics and tolerance to locally used herbicides.

While Riparian Forest Buffers do not produce large quantities of forage, livestock tend to congregate in the buffers due to the shade, water and succulent vegetation. In the process they compact the soil and may destroy the bank by climbing in and out of the water. Livestock use must be controlled in the Riparian Forest Buffer. If entire field is not managed according to the needs of the buffer, then the buffer must be separated by fence.

Tree and shrub species, which may be alternate hosts to undesirable pests, should be avoided. Species diversity will be considered to avoid loss of function due to species-specific pests.

Consider cultural resources when planning this practice. This practice may adversely affect

cultural resources and should comply with GM 420, Part 401, during planning, prior to installation and during maintenance.

Plants that deplete ground water should be used with caution in water-deficit areas.

Allelopathic impacts of plants should be considered.

The location, layout, species composition and density of the buffer should complement natural features, and mimic natural riparian forests.

PLANS AND SPECIFICATIONS

Specifications for applying this practice shall be prepared for each site and recorded using approved specification sheets, job sheets, technical notes, and narrative statements in the conservation plan, or other acceptable documentation.

OPERATION AND MAINTENANCE

The following actions shall be carried out to insure that this practice functions as intended throughout its expected life.

The riparian forest buffer will be inspected periodically and protected from adverse impacts such as excessive vehicular and pedestrian traffic, pest infestations, pesticides, livestock or wildlife damage and wildfire.

Use the Use Exclusion (472) standard and specification when the riparian forest buffer requires exclusion of animals, people or vehicles.

Use the Firebreak (394) standard and specification when needed to protect the buffer from wildfire.

Replacement of dead trees or shrubs and control of undesirable vegetative competition

will be continued until the buffer is, or will progress to, a fully functional condition.

As applicable, control of concentrated flow erosion and sediment deposition shall be controlled by a filter strip in Zone 3.

Any use of fertilizers, pesticides and other chemicals to assure buffer function shall not compromise the intended purpose. Use the Nutrient Management (590) and Pest Management (595) standards when fertilizer and pesticides are used.

REFERENCES

Agroforestry Note – Riparian #2. How to Design a Riparian Buffer for Agricultural Land. USDA National Agroforestry Center. September 1999. 6 pages*

Riparian Forest Buffer Conservation Practice Job Sheet. USDA – NRCS. January 1998. 4 pages*

Stream Corridor Restoration, Principles, Processes and Practices. NEH Part 653. USDA – NRCS. August 1998.

*Available online: www.unl.edu/nac/riparian.html

NATURAL RESOURCES CONSERVATION SERVICE

CONSERVATION PRACTICE STANDARD

APPROVAL AND CERTIFICATION

Riparian Forest Buffer

Code 391

(acres)

PRACTICE STANDARD APPROVED:

/s Susan Baggett

(State Forester)

May 1, 2000

(Date)

This practice standard is needed in the _____ Field Office
Technical Guide.

(RTL/DC)

(Date)

CERTIFICATION:

Reviewed and determined adequate without need of revision.

(Zone Specialist)

(Date)